

## CLAIMS

1. An antenna device for a portable radio communication device operable in at least a first and a  
5 second frequency band, the antenna device comprising:
- a first electrically conductive radiating element (10; 110; 210; 310; 410; 510) having a feeding portion (12) connectable to a feed device (RF) of the radio communication device;
  - 10 - a second electrically conductive radiating element (20; 120; 220; 320; 420; 520;) having a grounding portion connectable to ground;
  - a controllable switch (30) arranged between the first and second radiating elements for selectively  
15 interconnecting and disconnecting the radiating elements, the state of the switch being controlled by means of a control voltage input ( $V_{\text{Switch}}$ );
  - a first filter (40; 340; 440; 540) arranged between the feeding portion (12) and the control voltage  
20 input( $V_{\text{Switch}}$ ), wherein the first filter is arranged to block radio frequency signals,
- c h a r a c t e r i z e d   b y**
- a grounding portion (14) of the first radiating element, and
  - 25 - a high pass filter (50) arranged between the grounding portion (14) of the first radiating element and ground,

- wherein the first and second radiating element are generally planar and arranged at a predetermined distance above a ground plane.

2. The antenna device according to claim 1,  
5 wherein the first filter (40; 340; 440; 540;) is a low pass filter.

3. The antenna device according to claim 1 or 2,  
wherein the switch (30) comprises a PIN diode.

4. The antenna device according to any of claims  
10 1-3, comprising a second filter (60; 360; 460; 560) connected to the grounding portion of the second radiating element (20) and being connectable to ground.

5. The antenna device according to claim 4,  
15 wherein the second filter (60; 360; 460) is a low pass filter.

6. The antenna device according to claim 4,  
wherein the second filter (560) is a band-stop filter (460) having a stop-band at the lower of the first and  
20 second frequency bands.

7. The antenna device according to any of claims 1-6, wherein the first radiating element (310; 510) has a configuration that provides for more than one resonance frequency.

25 8. The antenna device according to any of claims 1-7, wherein the feeding portion (12) of the first radiating element (10) and the grounding portion (14) connected to the DC blocking arrangement (50) are

arranged on the same side of the first radiating element (10) and preferably on a short side of the first radiating element (10).

9. The antenna device according to any of claims 5 1-8, wherein at least one of the first and second radiating elements (110, 120) comprises a protruding portion (110a, 110b, 120a, 120b), and wherein the switch (30) is connected to the protruding portion.

10. The antenna device according to any of claims 10 1-9, comprising a generally planar printed circuit board (70), wherein the first and second radiating elements (10, 20) and the switch (30) are arranged generally parallel to and spaced apart from the printed circuit board.

15 11. The antenna device according to any of claims 1-10, wherein the antenna device has a volume less than  $3 \text{ cm}^3$  and preferably less than  $2 \text{ cm}^3$ .

12. The antenna device according to any of claims 1-11, wherein the antenna device is a PIFA.

20 13. The antenna device according to any of claims 1-12, wherein the position of the portable radio communication device is used to control the switch.

14. The antenna device according to any of claims 1-13, wherein the impedance of the first filter (40) 25 is purely resistive.

15. The antenna device according to any of claims 4-14, wherein the impedance of the second filter (60) is purely resistive.

16. A portable radio communication device, comprising a generally planar printed circuit board and an antenna device connected to a feed device (RF) with electronic circuits provided for transmitting and/or receiving RF signals, and a ground device, wherein the antenna device comprises:

- a first electrically conductive radiating element (10; 110; 210; 310; 410; 510) having a feeding portion (12) connected to the feed device (RF);
- 10 - a second electrically conductive radiating element (20; 120; 220; 320; 420; 520) having a grounding portion connected to the ground device;
- a controllable switch (30) arranged between the first and second radiating elements for selectively interconnecting and disconnecting the radiating elements, the state of the switch being controlled by means of a control voltage input ( $V_{\text{Switch}}$ );

a first filter (40; 340; 440; 540) arranged between the feeding portion (12) and the control voltage input( $V_{\text{Switch}}$ ) , wherein the first filter is arranged to block radio frequency signals,

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- a grounding portion (14) of the first radiating element, and
- 25 - a high pass filter (50) arranged between the grounding portion (14) of the first radiating element and ground,

- wherein the first and second radiating element are generally planar and arranged at a predetermined distance above a ground plane.